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Phrixosoma concavifrons – a sexually dimorphic Phrixosomatini (Coleoptera: Curculionidae) from the Udzungwa mountains in Tanzania

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Abstract

A new species of *Phrixosoma* from Tanzania is described and illustrated. This is a unique species for the genus in having a strongly concave female frons. Several characters are described for the first time for this genus, including male and female genitalia, mouthparts, thoracic sutures, and several overlooked features of the meso- and metatibiae and sternal processes.

Keywords: *Phrixosoma*, Udzungwa, Tanzania, Afrotropical region

Introduction

Phrixosoma is a little known genus of Scolytinae found in the tropical parts of Africa and America. This is a peculiar distribution, as very few genera are exclusively found on these two continents. In Scolytinae, only Micracidini show similar patterns, but only at higher taxonomic levels (Wood, 1982). Species of *Phrixosoma* have a distinct preference for trees in the plant family Clusiaceae (Guttiferae *sensu* Wood, 2007). All species studied in detail have been found under relatively thick bark where they feed on inner phloem or cambium. Breeding behaviour is typical for a bark beetle, with a mating niche close to the entrance hole, and female laying eggs in small pits along a transversely cut biramous egg tunnel.

Blandford (1897) described *Phrixosoma* based on *P. rude*. There are currently 24 species known, 15 from the Neotropics and 9 from the Afrotropical region (Wood, 2007; Wood & Bright, 1992). Hagedorn (1909) described the African genus *Bothryperus* based on *B. psaltes*, and Eggers (1920, 1929) described the Neotropical genus *Sphaerosinus* and the African genus *Neohylesinus*, but all three genera were later synonymised with *Phrixosoma* due to a generally uniform morphological character variation across species on the two continents (see Wood, 1978). A typical *Phrixosoma* is readily recognised by having divided eyes and elytral striae narrowly and sharply impressed, and by the peculiar shape of their metatibiae. None of the species are known to be strongly dimorphic.

A new species collected from the Udzungwa Mountains in Tanzania deviates from a typical *Phrixosoma* by having a strongly dimorphic frons. This paper presents a description of the new species and a necessary emendation of the diagnosis and description of the genus.

Phrixosoma Blandford

Phrixosoma Blandford, 1897: 148; Wood 1986: 43. Type species: *Phrixosoma rude* Blandford, 1897, by monotypy.
Bothryperus Hagedorn, 1909: 742. Type species: *Bothryperus psaltes*. Synonymy by Schedl 1963: 258.
Neohylesinus Eggers, 1920: 118. Type species: *Neohylesinus quadrioculatus* Eggers. Synonymy by Eggers, 1927: 196.
Sphaerosinus Eggers, 1929: 40. Type species: *Sphaerosinus striatus* Eggers. Synonymy by Wood, 1982: 204.

Revised description: **Head.** Eyes divided. Male frons convex with an obscure to clearly elevated median carina from epistoma towards vertex; female frons either similar to male or deeply concave. Antennal club flattened with two or three sutures weakly marked by setae, suture 1 partly septate, funiculus (including pedicel) 6-segmented.

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Maxillary palpus with 3 segments subequal in length; labial palpus with basal segment enlarged, as long as prementum, segment 2 short and broad, segment 3 narrow, three times longer than segment 2; ligula large and elevated above prementum, setose. **Pronotum** almost trapezoidal, broader than long, constricted on anterior third. **Elytra.** Base procurved with a low rim of crenulations; interstriae much broader than striae, flat, with granules; striae narrowly and deeply impressed. **Thoracic sclerites.** Scutellum rounded, slightly sunken. Postnotum very short, fused to metanotum at mesal one-third; scutoscutellar suture parabolic, following scutellar grove for less than one fifth of its length; pleural suture weakly zigzag shaped. **Legs.** Procoxae contiguous, prosternum along its anterior edge recurved as a blunt rim. Mesocoxae widely separated, mesocoxal process expanding anteriorly with lateral projections. Protibiae with 3–5 socketed teeth at expanded latero-distal angle, mucro short, almost straight; mesotibiae with lateral socketed teeth on distal half, smaller spines along its remaining length; metatibiae with a distinct lateral triangular extension close to distal end, with 2–6 lateral socketed teeth contiguously placed below triangular point, outer apical flange with a transverse row of 5–10 smaller socketed teeth, the area between lateral and apical teeth usually incised. All tarsi with segment 4 bilobed, deeply incised. **Male genitalia** (as known in 4 species) with spiculum gastrale slightly curved, without fork; aedeagus with very short apophyses less than one fifth the length of the tube; tegmen a closed ring with distinct anterior strut. **Proventriculus** (4 species) simple, apical plate short, without median suture, transverse ridges weakly developed; lateral teeth blunt, long and curled, apical and femoral teeth absent.

Distribution: In the Neotropics from Bolivia and Brazil (Mato Grosso) in the south, to Mexico (Oaxaca) and Cuba in the north. In the Afrotropical region from Angola and Tanzania in the south, to Uganda and Cameroon in the north (Wood & Bright, 1992).

Key to Neotropical species: Wood 1982; 2007

***Phrixosoma concavifrons* Jordal, sp. nov.**
(Figs. 1, 2)

Diagnosis: This is a unique species in *Phrixosoma* due to the strongly concave female frons with a long tuft of golden setae along the upper margin of the concavity.

Description: Length 1.85–2.10 mm, 2.0–2.1 times longer than wide. **Head.** Female frons broadly concave from well above upper level of eyes to epistoma, surface strongly reticulated, dull; vestiture consisting of long protruding golden setae along upper rim of frontal concavity down to upper level of eyes, continuing along lateral margin to epistoma as much shorter erect setae. Female eyes separated above by 3.1–3.2 times their width. Male frons weakly flattened, with a distinct narrow median carina from vertex to epistoma; vestiture modest, consisting of short hair-like setae. Male eyes separated above by 2.4–2.5 times their width. Antennal club flat, three sutures clearly marked by setae, first and second suture slightly angulate, first suture marked by a partial septum running two-thirds the length of entire suture; scapus with few setae, about three-quarter the length of club and funiculus combined. **Pronotum** 0.7–0.8 times as long as wide, broadest at base, curved anteriorly to a distinct constriction at anterior third; surface rugosely granulated, punctures absent; vestiture consisting of erect bristle-like setae which are longer towards the centre of notum. **Elytra** 1.4–1.5 times longer than wide, 2.0–2.2 times longer than pronotum, sides slightly oval, broadest at middle, narrowly rounded behind. Striae narrow, deeply impressed forming a sharp line, punctures elongated, irregular in size and depth. Interstriae 3–4 times wider than striae, flat, rugosely granulated, granules increasing in size posteriorly. Interstriae 10 elevated to the level of metacoxae. Vestiture consisting of three interstrial rows of curved pointed setae, setae in mid-row three times longer and uniseriate; strial setae present, very thin. **Hind wing** (see Jordal, 2009; Kukalova-Peck and Lawrence, 1993) on costa close to wing base with two short and closely placed setae, stigmal patch without setae; hind margin from level of CuA to tip with fine short setae. **Legs.** Mesocoxae separated by three times the width of scapus. Metacoxae separated by 1.5 times the width of scapus. Protibiae armed by four socketed teeth at expanded latero-apical angle; on anterior side a deep groove for retraction of tarsus. Mesotibiae with 5 socketed teeth along its lateral distal half, 4–6 smaller spines on remaining proximal half. Metatibiae with a pointed lateral extension on apical one-fifth armed by 2–3 socketed teeth, apically armed by 5–7 socketed teeth in a transverse row on the outer edge; apex concave with a sharp longitudinal flange separating tarsal socket and outer fringe of socketed teeth forming a corbel-like structure. **Vestiture on ventral sclerites.** Setae on metanepimeron trifid; on metasternum fine long setae, on venter consisting of transverse rows of long erect bristle-like setae on ventrites I–IV, with

ground vestiture consisting of fine tri- to pentafid setae. **Proventriculus** as in *P. minor* (Lopez-Buenfil *et al*., 2001). **Terminalia.** Aedeagus 5.1 times longer than wide, apex incised as a cleft, aedeagal body with a raised spiral shaped sclerite close to apex; apophyses very short, 0.15 as long as aedeagal body. Tegmen a closed ring, with distinct anterior strut (manubrium) slightly shorter than the apophyses. Spiculum gastrale as long as aedeagus, gently curved from apex towards level of tegmen, continue in straight line to anterior end of apohyses. Spermatheca with collum protruded, wrinkled, broadly separated from ramus; cornu apically broadly rounded, curved about 90 degrees from corpus.

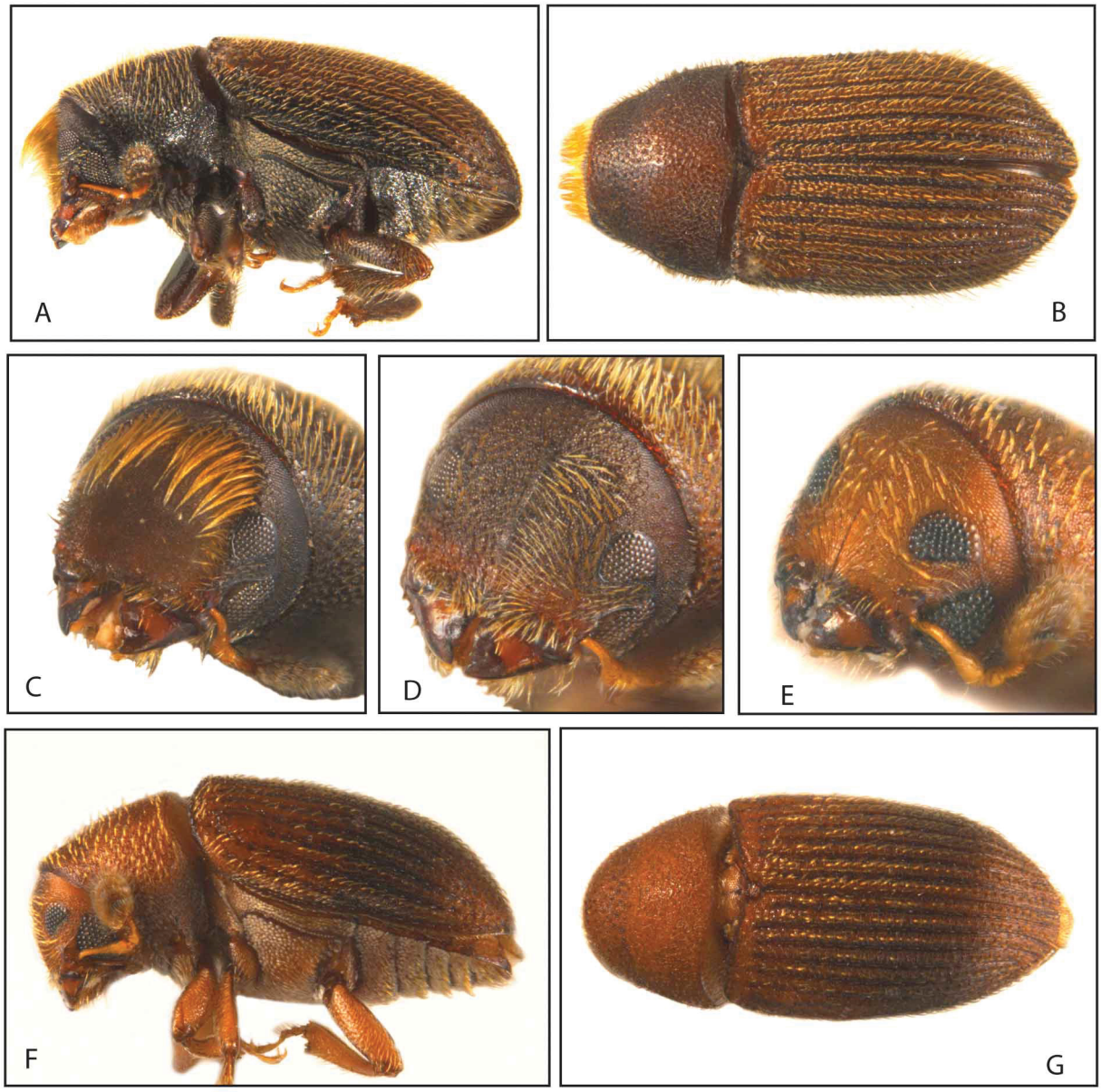

FIGURE 1. Dorsal, frontal and lateral views of *Phrixosoma concavifrons* **sp. n.** female (A–C) and male (D), and *P. uniseriata* (Eggers) (E–G).

Material examined. Holotype female: "TANZANIA, Morogoro prov., Sanje, GIS: −7.767, 36.868, ex fallen tree [6vii-2], 6. July 2010, B. Jordal, leg". Allotype male, 2 male and 3 female paratypes: same label as holotype. Two additional badly preserved specimens (1 male, 1 female) with the following label: "TANZANIA, Morogoro prov., Sanje, GIS: −7.767, 36.868, ex old log [5vii-4], 5. July 2010, B. Jordal, leg". The holotype and all other material are deposited at the entomological collection, University Museum of Bergen.

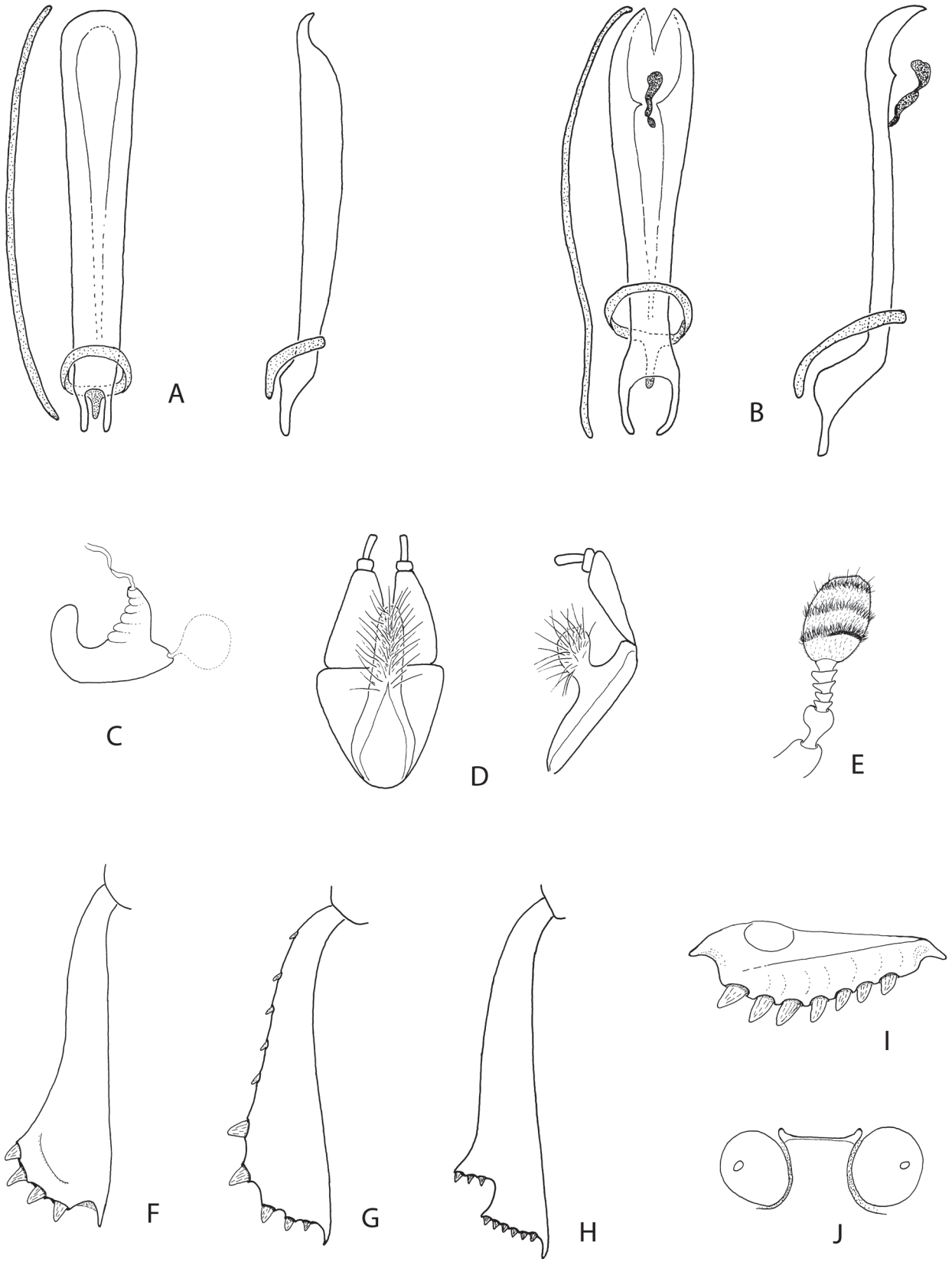

FIGURE 2. A, *Phrixosoma uniseriata* male genitalia, dorsal and lateral view. B–J, *P. concavifrons* **sp. n:** B, male genitalia, dorsal and lateral view; C, spermatheca; D, labium, dorsal (inner) and lateral view; E, antenna; F, protibia; G, mesotibia; H, metatibia; I, apical view of metatibia; J, mesosternal process.

Etymology: named by the strongly concave frons in the female.

Discussion: The new species has been compared to all African species of the genus (*P. fuscovillosa, P. garciniae, P. sinuosa, P. dubiosa, P. quadrioculata, P. uniseriata, P. major, P. nigra, P. psaltes, P. costata*) and four Neotropical species (*P. minor, P. rude, P. obesa, P. clusiae*), from which it clearly differ by the strongly concave female frons and by the longer middle row of interstrial setae. This is the first observation of such strong sexual dimorphism in the genus (Wood, 2007). It is nevertheless a typical *Phrixosoma* by all other morphological features: the male has a longitudinal carina in frons as most other species of the genus, the antennal funicle is 6-segmented, the club has a partial septum at the first suture, the eyes are divided, the interstriae has the typical flat and granulated structure with an abrupt transition to the narrow striae, and the metatibiae bears the characteristic incision between a lateral bundle of closely set lateral teeth and the distal row of smaller socketed teeth. The corbel-like apex of the metatibiae is a quite unique feature for Phrixosoma, only seen in Hylastini and a few other groups. Internal characters such as the male genitalia and the proventriculus are very similar to other species of *Phrixosoma* such as the Neotropical *P. minor* and the West African *P. uniseriata*. The male genitalia are particularly informative, as the very short apophyses are unique in Scolytinae. Furthermore, genetic data from four nuclear and one mitochondrial gene show that *P. concavifrons* is nested within the genus (Jordal & Cognato, unpublished manuscript).

Biology and distribution: This species is known only from two nearby localities at 1700 m altitude in the Udzungwa Mountains of Tanzania. Specimens were taken from very thick bark of a densely colonised host tree of diameter 15–30 cm, and were collected together with a small species of *Polygraphus*. Males and females join as monogamous pairs in a mating niche (nuptial chamber) with the female subsequently laying eggs in pits along a transversely cut biramous tunnel system which was 1–2 cm long. The male apparently stays with the female during egg laying, and probably stay longer such as in the males of *P. uniseriata,* which stay at least to late larval stage (unpublished data). Brood size ranged from 30–50 larvae (n=9). The larvae make regular mines more or less perpendicular to the egg gallery.

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Reference

Blandford, W.F.H. (1897) Family Scolytidae. *Biologia Centrali-Americana, Coleoptera,* 4, 145–184.

Eggers, H. (1920) 60 Neue Borkenkäfer (Ipidae) aus Afrika, nebst zehn neuen Gattungen, zwei Abarten. *Entomologische Blätten,* 16, 115–126.

Eggers, H. (1929) Eine neue Ipidengattung (Col.) aus Nordamerika. *Tijdschrift voor Entomologie,* 72, 40–41.

Hagedorn, J.M. (1909) Diagnosen bischer unbeschriebener Borkenkäfer (Col.). *Deutsche Entomologische Zeitschrift,* 1909, 733–746.

Jordal, B.H. (2009) The Madagascan geneus *Dolurgocleptes* Schedl (Coleoptera: Curculionidae, Scolytinae): description of a new species and transfer to the tribe Polygraphini. *Zootaxa,* 2014, 41–50.

Kukalova-Peck, J. & Lawrence, J.F. (1993) Evolution of the hind wing in Coleoptera. *The Canadian Entomologist,* 125, 181–258.

Lopez-Buenfil, J.A., Valdez-Carrasco, J., Equihua-Martinez, A. & Burgos-Solorio, A. (2001) El proventriculo como estructura para identificar generos Mexicanos de Scolytidae (Coleoptera). *Folia Entomologica Mexicana,* 40, 325–372.

Schedl, K.E. (1963) Zur Synonymie der Borkenkäfer, IX. *Entomologische Abhandlungen und Berichte aus dem Staatlisches Museum für Tierkunde in Dresden,* 28, 257–268.

Wood, S.L. (1978) A reclassification of the subfamilies and tribes of Scolytidae (Coleoptera). *Annales de la Sociètè entomologique de France,* 14, 95–122.

Wood, S.L. (1982) The bark and ambrosia beetles of North and Central America (Coleoptera: Scolytidae), a taxonomic monograph. *Great Basin Naturalist Memoirs,* 6, 1–1359.

Wood, S.L. (2007) *Bark and ambrosia beetles of South America (Coleoptera, Scolytidae)*. Provo, Utah: Monte L. Bean Life Science Museum, Brigham Young University, 900 pp, 230 plates.

Wood, S.L. & Bright, D. (1992) A catalog of Scolytidae and Platypodidae (Coleoptera). Part 2: Taxonomic index. *Great Basin Naturalist Memoirs,* 13, 1–1553.